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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/200,523	11/25/1998	SYED AON MUJTABA		4927

7590 06/21/2002

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EXAMINER

LOGSDON, JOSEPH B

ART UNIT	PAPER NUMBER
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2662

DATE MAILED: 06/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/200,523

Applicant(s)

MUJTABA, SYED AON

Examiner

Joe Logsdon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 May 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Claim Rejections—35 U.S.C. 103(a):

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fertner et al. in view of El-Arabawy et al.

With regard to claims 1, 2, 8, 9, 15, and 16, Fertner et al. teaches that digital information can be communicated using orthogonal frequency divided duplex (OFDD) (column 11, lines 36-41). This scheme can be used for full duplex DMT transmission (column 12, lines 30-35). "Full duplex" means that communication in the uplink is "separated" from that in the downlink in the sense that the uplink and downlink communications do not interfere. Fertner et al. fails to teach that the method uses specifically OFDM. Examiner takes Official Notice that OFDM and DMT have been well known to be closely related; in particular, OFDM is a version of DMT. Fertner et al. fails to teach that the method can be applied to a fixed wireless cellular loop communication system using a base station and subscriber units. El-Arabawy et al. teaches that OFDM can be used in mobile communications and in high bit rate radio local area networks (Abstract; Introduction); this suggests that the invention of Fertner et al. would be useful for a fixed wireless cellular loop communication system using a base station and subscriber units. It would have been obvious to one of ordinary skill in the art to modify the invention of Fertner et al. so that it uses specifically OFDM and so that it is applied to a fixed wireless cellular loop

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communication system using a base station and subscriber units, as suggested by El Arabawy et al., because such an arrangement would enable fixed wireless cellular loop communication systems using a base stations and subscriber units to benefit from the advantages offered by OFDM for high data rate signaling over time dispersive channels (Introduction in El Arabawy et al.).

With regard to claims 3, 10, and 17, Fertner et al. fails to teach that the communication between the base station and one group of subscriber units is separated from the communication between the base station and another group of subscriber units using at least one of CDMA, TDMA, or FDMA. Examiner takes Official Notice that the use of CDMA, TDMA, and FDMA for multiple access communication in a wireless communication system has been well known in the art. It would have been obvious to one of ordinary skill in the art to modify the invention of Fertner et al. so that the communication between the base station and one group of subscriber units is separated from the communication between the base station and another group of subscriber units using at least one of CDMA, TDMA, or FDMA because Examiner takes Official Notice that the use of CDMA, TDMA, and FDMA for multiple access communication in a wireless communication system has been well known in the art as a means for allowing several subscriber stations to communicate with the same base station without significant interference.

With regard to claims 4, 11, and 18, Fertner et al. teaches that there are advantages to assigning some of the subcarriers to the upstream direction and the others to the downstream direction (column 12, lines 36-47). In a preferred embodiment the bandwidth is split so that one group, which is used for one direction, consists of even subcarriers and the other group, which is used for the other direction, consists of odd subcarriers (column 12, lines 39-42). There therefore

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inherently exists some integer, M , such that a first subset of M subcarriers is assigned to the uplink, and a second subset is assigned to the downlink; these two subsets may or may not overlap.

With regard to claims 5, 12, and 19, Fertner et al. fails to teach that the assigning step is repeated for a plurality of time slots, such that the number of carriers in the first and second subsets varies across the time slots in accordance with uplink and downlink traffic demands. Examiner takes Official Notice that designing a multi-carrier communication system so that the number of carriers that are used is varied in accordance with a traffic demand has been common practice in the art. It would have been obvious to one of ordinary skill in the art to modify the teaching of Fertner et al. so that the assigning step is repeated for a plurality of time slots, such that the number of carriers in the first and second subsets varies across the time slots in accordance with uplink and downlink traffic demands because Examiner takes Official Notice that such an arrangement would have been common practice in the art as a means for making efficient use of the available bandwidth by avoiding the waste of channels (or subchannels) when traffic demand is low.

With regard to claims 6, 7, 13, 14, 20, and 21, Fertner et al. teaches that in a preferred embodiment the bandwidth is split so that one group, which is used for one direction, consists of even subcarriers and the other group, which is used for the other direction, consists of odd subcarriers (column 12, lines 39-42). Efficiencies can be gained by applying the inverse discrete Fourier transform (IDFT) to only even or odd subcarriers and the discrete Fourier transform (DFT) to only odd or even subcarriers, respectively (column 12, lines 42-47).

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3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Isaksson et al., Wallace et al., Tore, Nelson et al., and Bingham are cited to show the state of the art.

Response to Arguments:

4. Applicant argues that the references fail to teach or suggest separation of the uplink from the downlink using OFDM. But Fertner et al. teaches that this separation (full duplex) can use DMT, and the relationship between DMT and OFDM has been well known in the art. Isaksson et al. teaches that DMT is essentially the same as OFDM (column 1, lines 13-18). Wallace et al. teaches that DMT and OFDM are similar (column 3, lines 20-22). Tore teaches that DMT and OFDM are similar—differing only in that DMT is used for copper wires, but OFDM is used for radio applications (column 1, lines 28-31). Nelson et al. teaches that OFDM is a subset of DMT (column 6, lines 30-34).

Applicant argues that El-Arabawy is limited to the application of OFDM to downlink signals. But El-Arabawy nowhere teaches or suggests such a limitation. Furthermore, a system that uses downlink OFDM and uplink DMT (whether or not the DMT is also OFDM) in full duplex (a feature taught in Fertner et al.) “separation” of channels between uplink and downlink occurs (because full duplex is used) and OFDM is used.

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Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Logsdon whose telephone number is (703) 305-2419. The examiner can normally be reached on Monday through Friday from 1:00 pm to 9:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou, can be reached at (703) 305-4744.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4700.

6. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or faxed to:

(703) 872-9314

For informal or draft communications, please label "PROPOSED" or "DRAFT".

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Joe Logsdon

Patent Examiner

Friday, June 14, 2002


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